

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) In an internet exchange carrying multicast content, a method for intelligently forwarding a content packet received at a layer 2 switch, the method comprising the steps of:
 - receiving the content packet at the layer 2 switch;
 - determining whether a multicast indicator is present in a destination address included in the content packet; and
 - if said multicast indicator is present, then
 - querying a forwarding memory based on a lookup key,
 - determining an outgoing port for the content packet based on the result of said querying of said forwarding memory, and
 - forwarding the content packet to said outgoing port for subsequent delivery to a destination device.
2. (Original) The method of claim 1, further comprising the step of:
 - deriving a destination MAC address from the content packet, wherein said destination MAC address serves as said lookup key to query said forwarding memory.
3. (Original) The method of claim 2, further comprising the step of:
 - querying a forwarding table within said forwarding memory based on said lookup key, wherein said forwarding table comprises at least one outgoing port index corresponding to one or more destination MAC addresses.

4. (Original) The method of claim 1, further comprising the step of:

extracting a source address, a destination address, a protocol type, and an incoming port from the content packet to derive an explicit source lookup key, wherein said explicit source lookup key serves as said lookup key to query said forwarding memory.

5. (Original) The method of claim 4, further comprising the step of:

querying a session table within said forwarding memory based on said lookup key, wherein said session table comprises one or more session entries, each session entry comprising a source address, a destination address, protocol type, an incoming port, and an outgoing port index.

6. (Original) The method of claim 1, further comprising the step of:

creating a new entry in said forwarding memory if the result of said querying of said forwarding memory returns no match for said lookup key, wherein said new entry includes a cross-reference to said outgoing port for subsequent queries.

7. (Original) The method of claim 6, further comprising the step of:

processing a neighbor list to determine said outgoing port from a destination address indicated in the content packet in response to the result.

8. (Original) The method of claim 1, further comprising the steps of:

returning an outgoing port index as the result of said querying of said forwarding memory; and

querying an outgoing port lookup table to determine said outgoing port.

9. (Original) The method of claim 8, further comprising the step of:
receiving a control packet at the layer 2 switch, wherein said control packet includes at least one of a join set and a prune set for a multicast group.
10. (Original) The method of claim 9, further comprising the step of:
modifying at least one of said forwarding memory and said outgoing port lookup table in response to said control packet.
11. (Original) A layer 2 switch for intelligently forwarding a content packet carrying multicast content, comprising:
means for determining whether a multicast indicator is present in a destination address included in the content packet;
means for querying a forwarding memory based on a lookup key;
means for determining an outgoing port for the content packet based on the result of said querying of said forwarding memory; and
means for forwarding the content packet to said outgoing port for subsequent delivery to a destination device.
-

12. (New) A method for handling a control message from a router, the method comprising:
updating a source-group data structure using information from the control message, the source-group data structure containing data regarding a multicast group; and

adding an outgoing port index to said source-group table, said outgoing port index identifying a port that received the control message.

13. (New) The method of claim 12, wherein said source-group data structure is a source-group table.

14. (New) The method of claim 12, further comprising:

creating an entry in an outgoing port lookup table, said entry associating said outgoing port index to said port that received the control message.

15. (New) The method of claim 12, further comprising:

A⁴ searching in a forwarding table for a forwarding entry having a destination hardware address matching a destination hardware address for a multicast group indicated by the control message; and

updating said forwarding entry in said forwarding table if a destination hardware address matching a destination hardware address for said multicast group is found.

16. (New) A method for handling a control message from a router, the method comprising:

deriving an explicit source lookup key from the control message;

retrieving an outgoing port index associated with an entry in a session data structure, said entry corresponding to said explicit source lookup key; and

updating an outgoing lookup table entry corresponding to said outgoing port index with information regarding designated devices in said multicast group indicated by the control message.

17. (New) The method of claim 16, wherein said session data structure is a session table.

18. (New) A method for handling a control message from a router, the method comprising:
determining if the control message establishes shared source distribution trees or explicit source distribution trees;

updating a source-group data structure using information from the control message, the source-group data structure containing data regarding a multicast group if the control message establishes shared source distribution trees;

adding an outgoing port index to said source-group table, said outgoing port index identifying a port that received the control message if the control message establishes shared source distribution trees;

deriving an explicit source lookup key from the control message if the control message establishes explicit source distribution trees;

retrieving an outgoing port index associated with an entry in a session data structure, said entry corresponding to said explicit source lookup key if the control message establishes explicit source distribution trees; and

updating an outgoing lookup table entry corresponding to said outgoing port index with information regarding designated devices in said multicast group indicated by the control message if the control message establishes explicit source distribution trees.

19. (New) The method of claim 18, wherein said source-group data structure is a source-group table.

20. (New) The method of claim 18, further comprising:

creating an entry in an outgoing port lookup table, said entry associating said outgoing port index to said port that received the control message if the control message establishes shared source distribution trees.

21. (New) The method of claim 18, further comprising:

searching in a forwarding table for a forwarding entry having a destination hardware address matching a destination hardware address for a multicast group indicated by the control message if the control message establishes shared source distribution trees; and

A4 updating said forwarding entry in said forwarding table if a destination hardware address matching a destination hardware address for said multicast group is found and if the control message establishes shared source distribution trees.

22. (New) The method of claim 18, wherein said session data structure is a session table.

23. (New) The method of claim 18, further comprising:

determining if the control message is a hello or join/prune message; and
performing said determining, updating a source-group data structure, adding, deriving, retrieving, and updating an outgoing lookup table entry only if said control message is a join/prune message.

24. (New) The method of claim 23, further comprising:

creating or updating a neighbor list using said hello message, said neighbor list identifying address and port information regarding a device which sent the control message.

25. (New) An apparatus for handling a control message from a router, the apparatus comprising:

means for updating a source-group data structure using information from the control message, the source-group data structure containing data regarding a multicast group; and

means for adding an outgoing port index to said source-group table, said outgoing port index identifying a port that received the control message.

26. (New) The apparatus of claim 25, wherein said source-group data structure is a source-group table.

27. (New) The apparatus of claim 25, further comprising:

means for creating an entry in an outgoing port lookup table, said entry associating said outgoing port index to said port that received the control message.

28. (New) The apparatus of claim 25, further comprising:

means for searching in a forwarding table for a forwarding entry having a destination hardware address matching a destination hardware address for a multicast group indicated by the control message; and

means for updating said forwarding entry in said forwarding table if a destination hardware address matching a destination hardware address for said multicast group is found.

29. (New) An apparatus for handling a control message from a router, the apparatus comprising:

means for deriving an explicit source lookup key from the control message;

means for retrieving an outgoing port index associated with an entry in a session data structure, said entry corresponding to said explicit source lookup key; and

means for updating an outgoing lookup table entry corresponding to said outgoing port index with information regarding designated devices in said multicast group indicated by the control message.

30. (New) The method of claim 29, wherein said session data structure is a session table.

31. (New) An apparatus for handling a control message from a router, the apparatus comprising:

means for determining if the control message establishes shared source distribution trees or explicit source distribution trees;

means for updating a source-group data structure using information from the control message, the source-group data structure containing data regarding a multicast group if the control message establishes shared source distribution trees;

means for adding an outgoing port index to said source-group table, said outgoing port index identifying a port that received the control message if the control message establishes shared source distribution trees;

means for deriving an explicit source lookup key from the control message if the control message establishes explicit source distribution trees;

means for retrieving an outgoing port index associated with an entry in a session data structure, said entry corresponding to said explicit source lookup key if the control message establishes explicit source distribution trees; and

means for updating an outgoing lookup table entry corresponding to said outgoing port

index with information regarding designated devices in said multicast group indicated by the control message if the control message establishes explicit source distribution trees.

32. (New) The apparatus of claim 31, wherein said source-group data structure is a source-group table.

33. (New) The apparatus of claim 31, further comprising:

A means for creating an entry in an outgoing port lookup table, said entry associating said outgoing port index to said port that received the control message if the control message establishes shared source distribution trees.

34. (New) The apparatus of claim 31, further comprising:

means for searching in a forwarding table for a forwarding entry having a destination hardware address matching a destination hardware address for a multicast group indicated by the control message if the control message establishes shared source distribution trees; and

means for updating said forwarding entry in said forwarding table if a destination hardware address matching a destination hardware address for said multicast group is found and if the control message establishes shared source distribution trees.

35. (New) The apparatus of claim 31 wherein said session data structure is a session table.

36. (New) The apparatus of claim 31, further comprising:

means for determining if the control message is a hello or join/prune message; and

means for performing said determining, updating a source-group data structure, adding, deriving, retrieving, and updating an outgoing lookup table entry only if said control message is a join/prune message.

37. (New) The apparatus of claim 36, further comprising:

creating or updating a neighbor list using said hello message, said neighbor list identifying address and port

A⁴
38. (New) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for handling a control message from a router, the method comprising:

updating a source-group data structure using information from the control message, the source-group data structure containing data regarding a multicast group; and

adding an outgoing port index to said source-group table, said outgoing port index identifying a port that received the control message.

39. (New) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for handling a control message from a router, the method comprising:

deriving an explicit source lookup key from the control message;

retrieving an outgoing port index associated with an entry in a session data structure, said entry corresponding to said explicit source lookup key; and

updating an outgoing lookup table entry corresponding to said outgoing port index with

information regarding designated devices in said multicast group indicated by the control message.

40. (New) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for method for handling a control message from a router, the method comprising:

determining if the control message establishes shared source distribution trees or explicit source distribution trees;

AX4 updating a source-group data structure using information from the control message, the source-group data structure containing data regarding a multicast group if the control message establishes shared source distribution trees;

adding an outgoing port index to said source-group table, said outgoing port index identifying a port that received the control message if the control message establishes shared source distribution trees;

deriving an explicit source lookup key from the control message if the control message establishes explicit source distribution trees;

retrieving an outgoing port index associated with an entry in a session data structure, said entry corresponding to said explicit source lookup key if the control message establishes explicit source distribution trees; and

updating an outgoing lookup table entry corresponding to said outgoing port index with information regarding designated devices in said multicast group indicated by the control message if the control message establishes explicit source distribution trees.
